

SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Electronics & Telecommunication Engg

Academic Year: 2022

Duration: 3 hours

Date: 09.01.2023

Time: 10:30 am to 01:30 pm

Subject: Mobile Communication System (Semester VII)

Marks: 75

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

- (1) This question paper contains two pages.
- (2) All Questions are Compulsory.
- (3) All questions carry equal marks.
- (4) Answer to each new question is to be started on a fresh page.
- (5) Figures in the brackets on the right indicate full marks.
- (6) Assume suitable data wherever required, but justify it.
- (7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	What are the different types of small-scale fading? OR i. List down the attributes of Femto Cells. ii. Give any 2 applications of Femto Cells.	[05] [03] [02]
Q1 (b)	A certain city has an area of 1,300 square km and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 km and the city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 kHz. Assume a GOS of 2% for an Erlang B system is specified. If the offered traffic per user is 0.03 Erlangs, compute: (a) the number of cells in the service area, (b) the number of channels per cell, (c) traffic intensity of each cell, (d) the maximum carried traffic; (e) the total number of users that can be served for 2% GOS, How will the number of users change in part (a) if the reuse pattern changes to 4?	[10]
Q2 (a)	i. What is Umbrella Cell concept in cellular networks? ii. How does capacity enhancement work in cellular system, explain with any one technique? OR If a signal to interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (a) $n = 4$,	[04] [06] [10]

	<p>(b) $n = 3$? Assume that there are 6 co-channels cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations. What is the effect of path loss exponent on signal to interference ratio?</p>	
Q2 (b)	Explain multipath fading with proper figure and differentiate between Rayleigh and Ricean fading models.	[05]
Q3 (a)	<p>What are the drawbacks of CDMA (IS-95)? Enlist and briefly explain.</p> <p style="text-align: center;">OR</p> <p>What do you understand by prioritizing handoffs?</p>	<p>[05]</p> <p>[05]</p>
Q3 (b)	<p>Why security is needed in GSM and how is it implemented using authentication and authorization?</p> <p style="text-align: center;">OR</p> <p>How does UMTS network architecture differs from GSM architecture? Draw the UMTS architecture and explain the difference.</p>	<p>[10]</p> <p>[10]</p>
Q4 (a)	<p>Draw SDR architecture giving the function of every component.</p> <p style="text-align: center;">OR</p> <p>i. Elaborate spectrum sensing. ii. Compare TDD and FDD frame structures of LTE.</p>	<p>[08]</p> <p>[04]</p> <p>[04]</p>
Q4 (b)	Draw the network architecture of cognitive radio and explain function of every component.	[07]
Q5 (a)	<p>Solve any two.</p> <p>i. What are the different network elements in an LTE Radio Network? Briefly explain the function of each.</p> <p>ii. What are the key performance indicators for 4G network planning?</p> <p>iii. What is IEEE 802.11n Coordinated Multipoint transmission and reception (CoMP)?</p> <p>iv. What do you understand by carrier aggregation?</p>	<p>[05]</p> <p>[05]</p> <p>[05]</p> <p>[05]</p>
Q5 (b)	What is LTE Radio Network Optimisation?	[05]

